(P 6) A Comparative Study on the Effects of Adipose Tissue Derived and Bone Marrow Mesenchymal Stem Cells on Neurons/Glial Cells Viability, Proliferation and Differentiation

C.A. Ribeiro[1], A.J. Salgado[1], J.S. Fraga[1], N.M. Neves[2,3], J.M. Gimble[4], R.L. Reis[2,3], N. Sousa[1]

[1]Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, Braga, Portugal.
[2]3B's Research Group—Biomaterials, Biodegradable and Biomimetics, Department of Polymer Engineering, University of Minho, Braga, Portugal.
[3]IBB, Institute of Bioengineering and Biotechnology, PT Associated Lab, Braga, Portugal.
[4]Stem Cell Laboratory, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA 70808, USA.

It is known that both Mesenchymal Stem Cells (MSCs) and Adipose-derived Stem Cells (ASCs) are able to ameliorate the CNS condition upon injury. However it is still not clear whether they have the similar or opposite effects on the different CNS derived cell populations. In this sense the objective of the present work was to understand if ASCs and MSCs preferentially act on different CNS derived cell populations. Hippocampal neurons and glial cells were exposed to MSCs and ASCs conditioned media (CM) (obtained 24, 48, 72 and 96 after 3 days of culture of HUCPVCs) for 1 week. Cell viability experiments (MTS test) revealed that CM obtained for both cell populations at all time points did not cause any deleterious effects on neurons and glial cells. Immunocytochemistry and total cell counts revealed that hippocampal cultures incubated with CM displayed higher numbers of neurons (MAP-2 positive cells) when compared to the control. However this effect was higher for ASCs CM (up to 6 fold) when compared to MSCs CM (up to 2 fold). Furthermore it was also observed in glial cell cultures that MSCs CM preferentially stimulated oligodendrocytes (O4) proliferation. Similar effects on hippocampal neurons populations were observed whenever direct contact co-culture systems were used. The work here in presented suggests that ASCs and MSCs release different growth factors. Moreover it was also observed that

ASCs secrete neuroregulary molecules that preferentially promote neuronal differentiation/survival, while MSCs mainly act upon glial cell populations, namely oligodendrocytes.